What is claimed is:

1   1. In a VCT control system having a predetermined set point with a set point value and a
2   set point filter filtering the set point and deriving a filtered set point value, the
3   control system generates an error signal by subtracting the measured phase value
4   from the filtered set point value, the control system has a control law for
5   processing the error signal, and the control system further has a method for
6   modifying the error signal for reducing the excessive VCT response time caused
7   by VCT undershooting its filtered set point, the method comprising the steps of:

8   providing an initial error;

9   setting the initial error as the error

10   subtracting the set point value from a phase value if a first set of conditions are
11   met; and

12   setting the difference of the above step as the error.

1   2. The method of claim 1 further comprising the steps of:

2   subtracting the phase value from the set point value if a second set of conditions
3   are met; and

4   setting the difference of the above step as the error.

1   3. The method of claim 2, wherein the second set of conditions comprising:

2   the set point value is less than filtered set point value, and the phase value is less
3   than the filtered set point value as well; and

4   the phase value is less than the set point value.

1   4. The method of claim 1 further comprising the steps of setting the error to zero if a third
2   set of conditions are met.

1   5. The method of claim 1 further comprising the steps of keeping the initial error as the
2   error if a fourth set of conditions are met.

1   6. The method of claim 1, wherein the first set of conditions comprising:

2   the set point value is greater than filtered set point value, and the phase value is

3   greater than the filtered set point value as well; and

4   the phase value is greater than the set point value.

1   7. A VCT control system comprising:

2   a predetermined set point with a set point value;

3   a set point filter filtering the set point and deriving a filtered set point value;

4   an error signal generated by the control system through subtracting the measured

5   phase value from the filtered set point value; and

6   an error zero treatment block having the set point value and the filtered set point

7   value, the error zero treatment block comprising a method generating an

8   error signal for reducing the excessive VCT response time caused by VCT

9   undershooting its filtered set point, the method comprising the steps of:

10   providing an initial error;

11   setting the initial error as the error

12   subtracting the set point value from a phase value if a first set of conditions are

13   met; and

14   setting the difference of the above step as the error.

1   8. The system of claim 7 wherein the method further comprising the steps of:

2   subtracting the set point value from a phase value if a second set of conditions are

3   met; and

4   setting the difference of the above step as the error.

9. The system of claim 8, wherein the second set of conditions comprising:

> the set point value is less than filtered set point value, and the phase value is less than the filtered set point value as well; and

> the phase value is less than the set point value.

10. The system of claim 7, wherein the method further comprising the steps of setting the error to zero if a third set of conditions are met.1

11. The system of claim 7, wherein the method further comprising the steps of keeping the initial error as the error if a fourth set of conditions are met.

12. The method of claim 7, wherein the first set of conditions comprising:

> the set point value is greater than filtered set point value, and the phase value is greater than the filtered set point value as well; and

> the phase value is greater than the set point value.